US009091112B2

(12) **United States Patent**
Millman et al.

(10) **Patent No.: US 9,091,112 B2**
(45) **Date of Patent: Jul. 28, 2015**

(54) **SECURITY PANELS FOR COVERING WINDOW AND DOOR OPENINGS IN BUILDING STRUCTURES**

(71) Applicants: **Scott R. Millman**, Farmington Hills, MI (US); **Justin A. Comstock**, Lake Orion, MI (US)

(72) Inventors: **Scott R. Millman**, Farmington Hills, MI (US); **Justin A. Comstock**, Lake Orion, MI (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **14/194,988**

(22) Filed: **Mar. 3, 2014**

(65) **Prior Publication Data**

US 2014/0245673 A1 Sep. 4, 2014

Related U.S. Application Data

(60) Provisional application No. 61/772,439, filed on Mar. 4, 2013.

(51) **Int. Cl.**

E06B 9/02	(2006.01)
E06B 5/02	(2006.01)
E06B 9/04	(2006.01)

(52) **U.S. Cl.**
CPC . ***E06B 9/02*** (2013.01); ***E06B 5/025*** (2013.01); ***E06B 9/04*** (2013.01)

(58) **Field of Classification Search**
CPC E04C 2/44; E06B 3/28; E06B 9/00
USPC 52/202–203, 783.12; 244/129.3
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

2,370,803	A *	3/1945	Kronenbitter	52/537
2,639,876	A *	5/1953	Misfeldt	244/124
3,014,558	A *	12/1961	Noyes	52/82
3,911,630	A *	10/1975	Nally	52/2.12
4,193,232	A *	3/1980	Almsted et al.	52/98
4,432,171	A *	2/1984	Boot	52/79.1
5,466,500	A *	11/1995	Pluim	428/41.6
5,758,457	A *	6/1998	Achen	52/198
5,862,639	A *	1/1999	Abou-Rached	52/223.6
5,918,430	A *	7/1999	Rowland	52/202
5,996,292	A *	12/1999	Hill et al.	52/202
8,656,664	B2 *	2/2014	Glass et al.	52/202
8,726,588	B2 *	5/2014	Jakus et al.	52/203
2007/0245672	A1 *	10/2007	Herlache et al.	52/602
2009/0100781	A1 *	4/2009	Hatamian et al.	52/578
2012/0324804	A1 *	12/2012	Smith	52/106
2013/0326973	A1 *	12/2013	Rivera	52/202

FOREIGN PATENT DOCUMENTS

GB	190424381	A *	10/1905

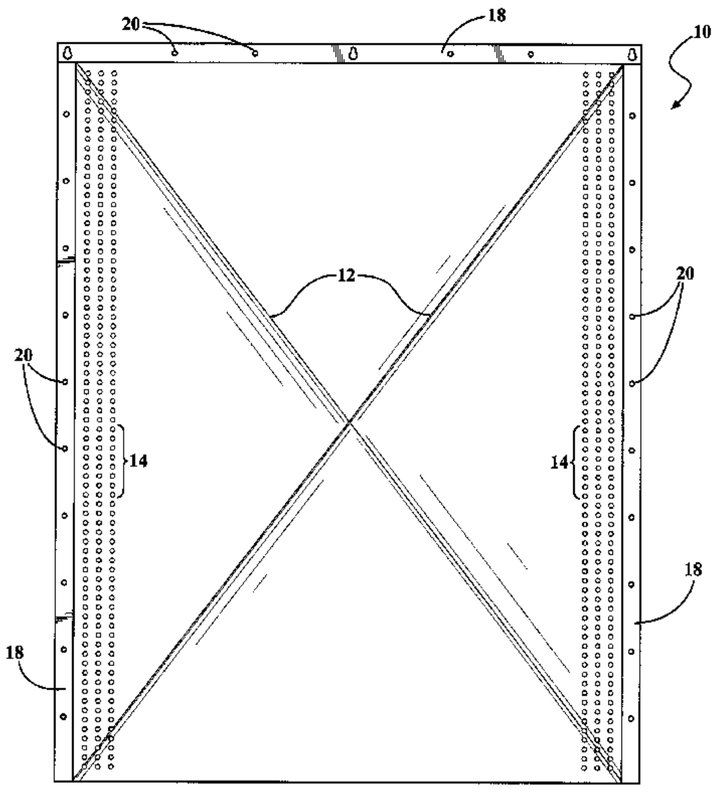
* cited by examiner

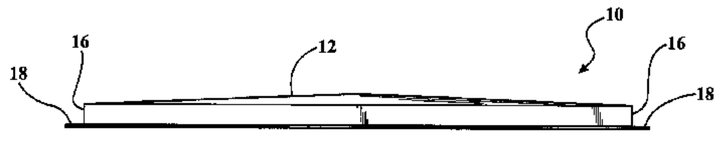
Primary Examiner — Jeanette E Chapman
(74) *Attorney, Agent, or Firm* — Young Basile Hanlon & MacFarlane PC

(57) **ABSTRACT**

A security panel apparatus and a method for covering window and door openings in building structures using the security panel apparatus are disclosed. One example security panel includes a main panel section including stiffening bends extending diagonally between opposite corners of the main panel section. The security panel also includes a plurality of side flanges extending away from the main panel section toward the opening in the building structure when the security panel is in an installation position and a plurality of edge sections each extending away from one of the side flanges in a direction generally parallel to the main panel section. The security panel also includes a plurality of apertures formed in at least one of the edge sections.

19 Claims, 4 Drawing Sheets





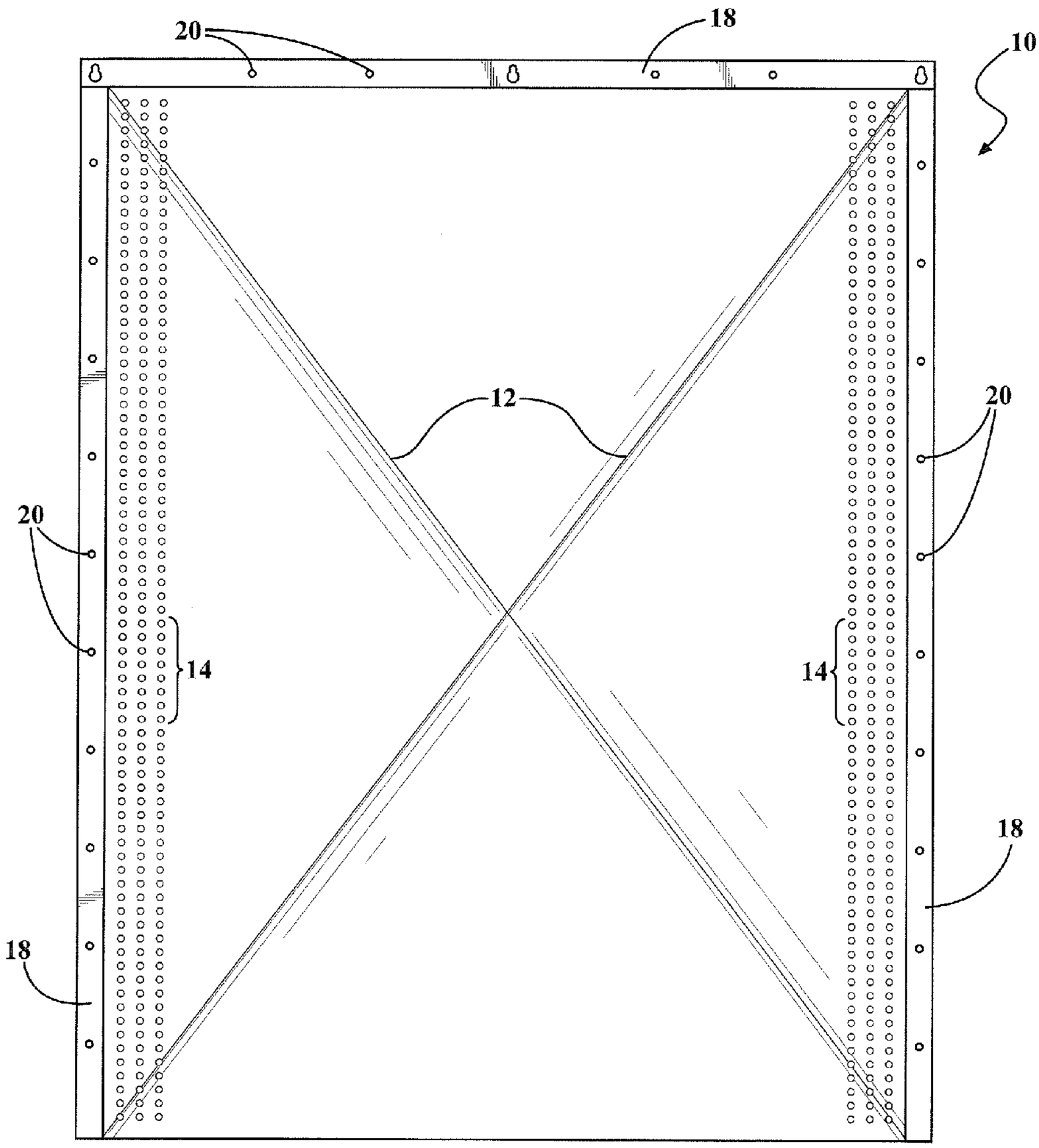
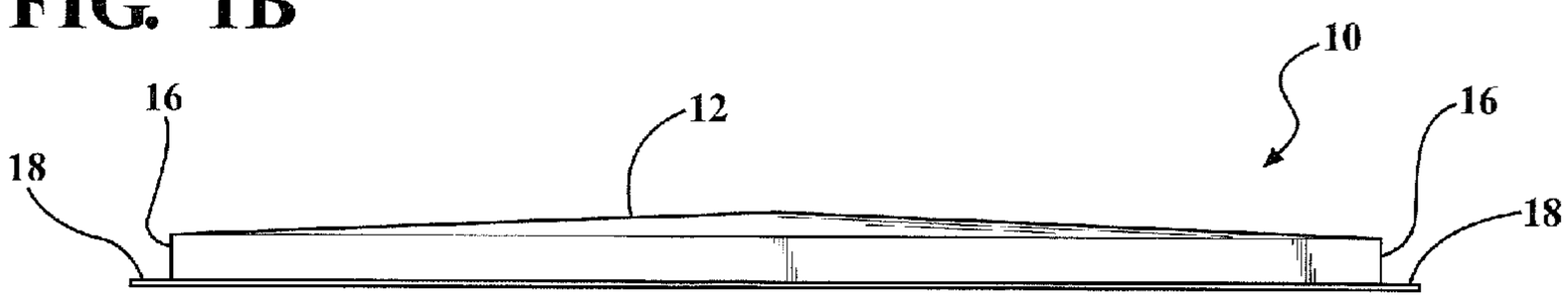


FIG. 1A

FIG. 1B



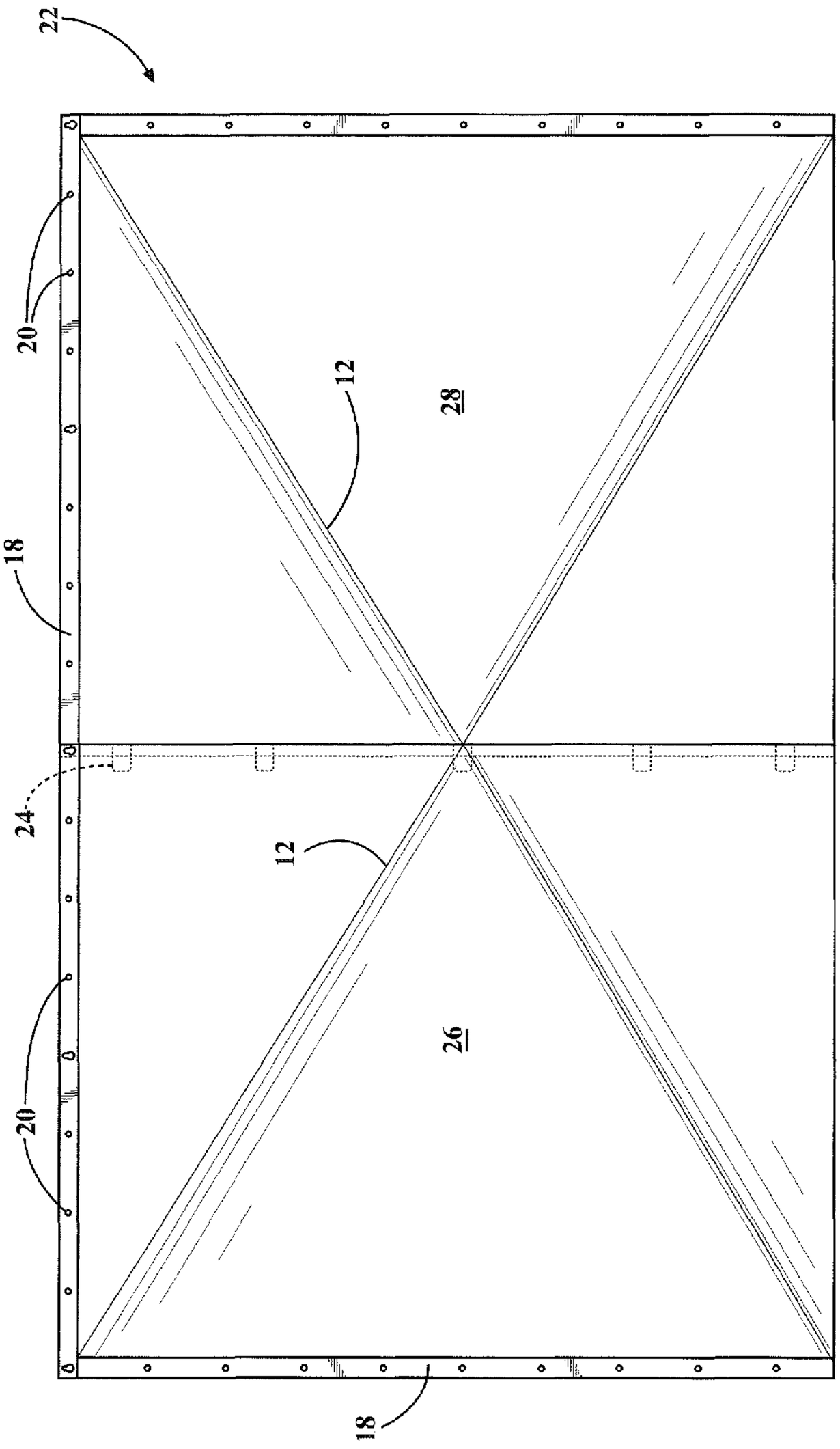


FIG. 2A

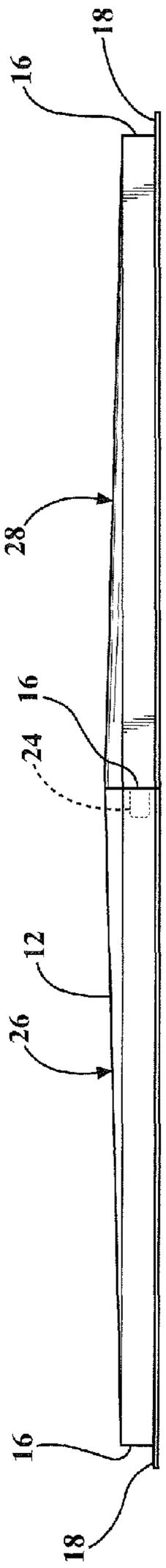


FIG. 2B

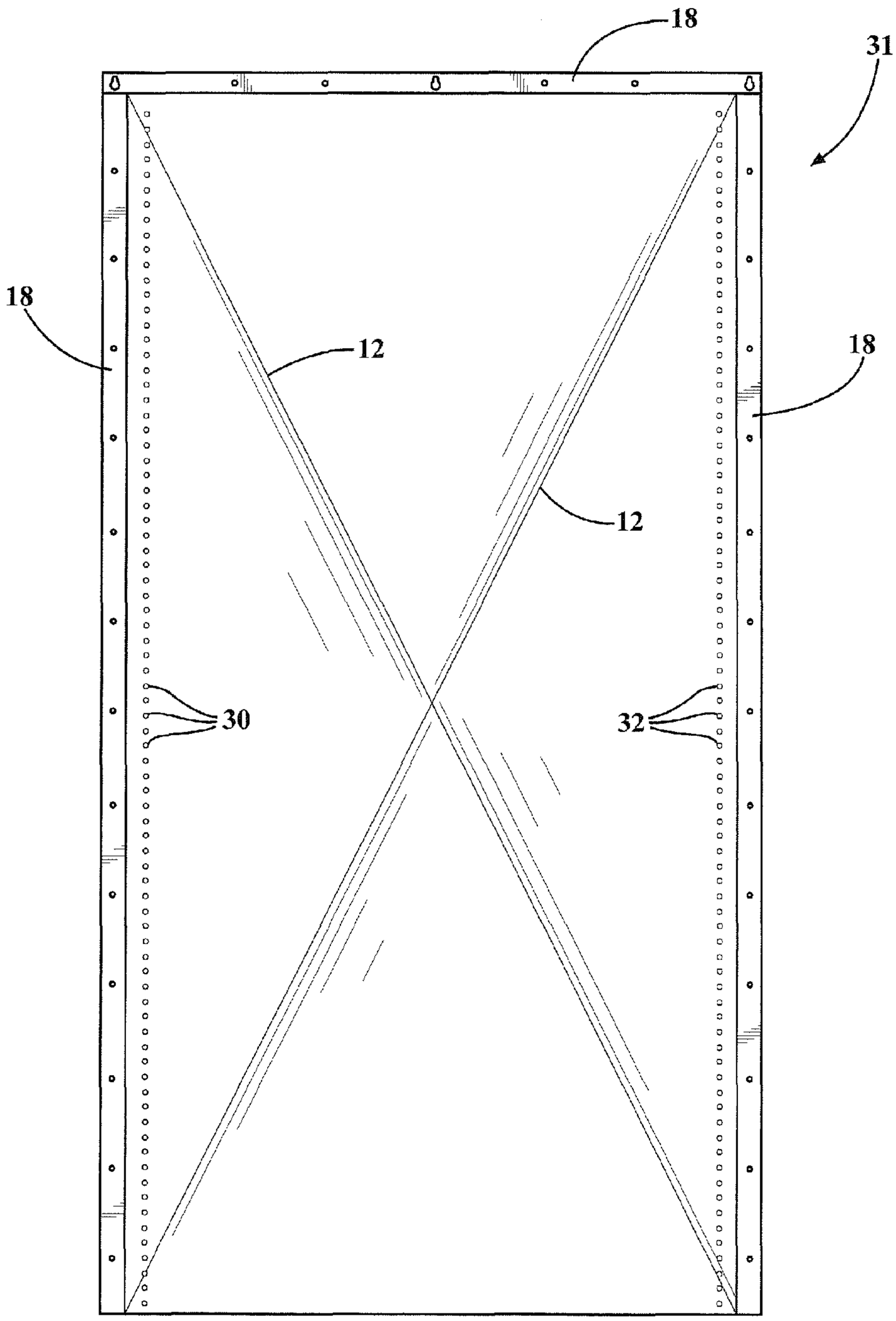
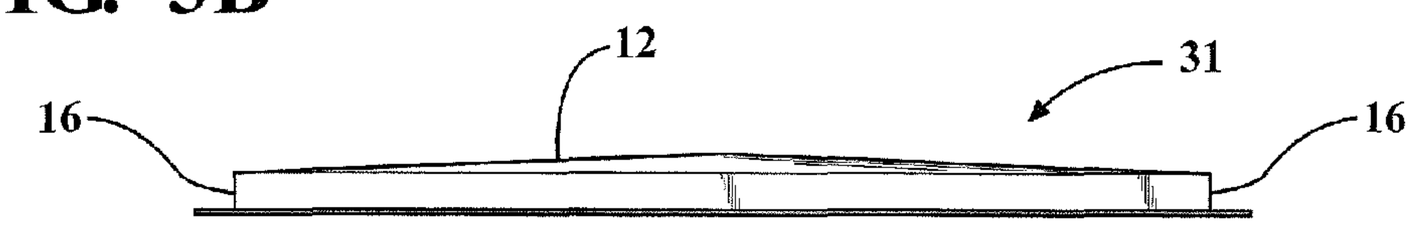


FIG. 3A

FIG. 3B



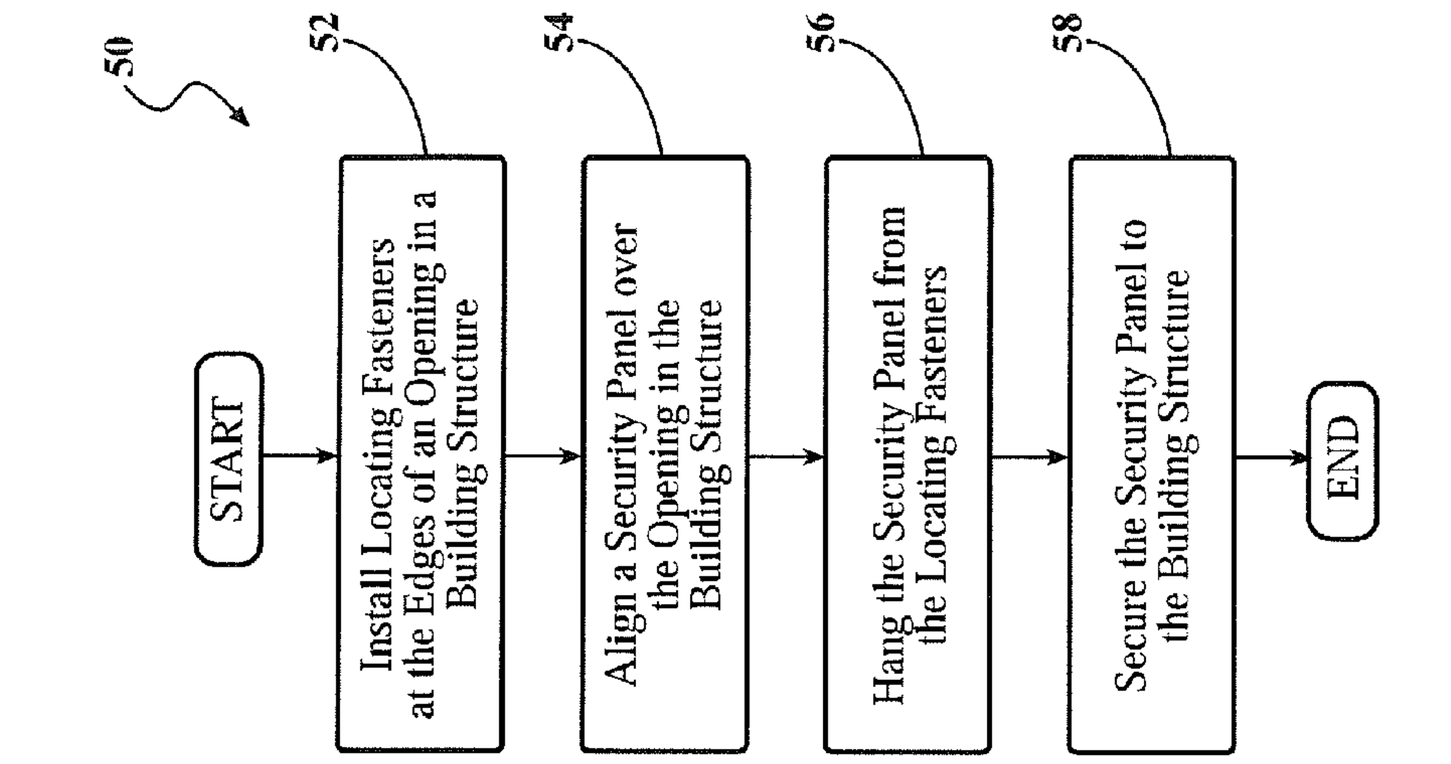

50
START
52
Install Locating Fasteners at the Edges of an Opening in a Building Structure
54
Align a Security Panel over the Opening in the Building Structure
56
Hang the Security Panel from the Locating Fasteners
58
Secure the Security Panel to the Building Structure
END

FIG. 5

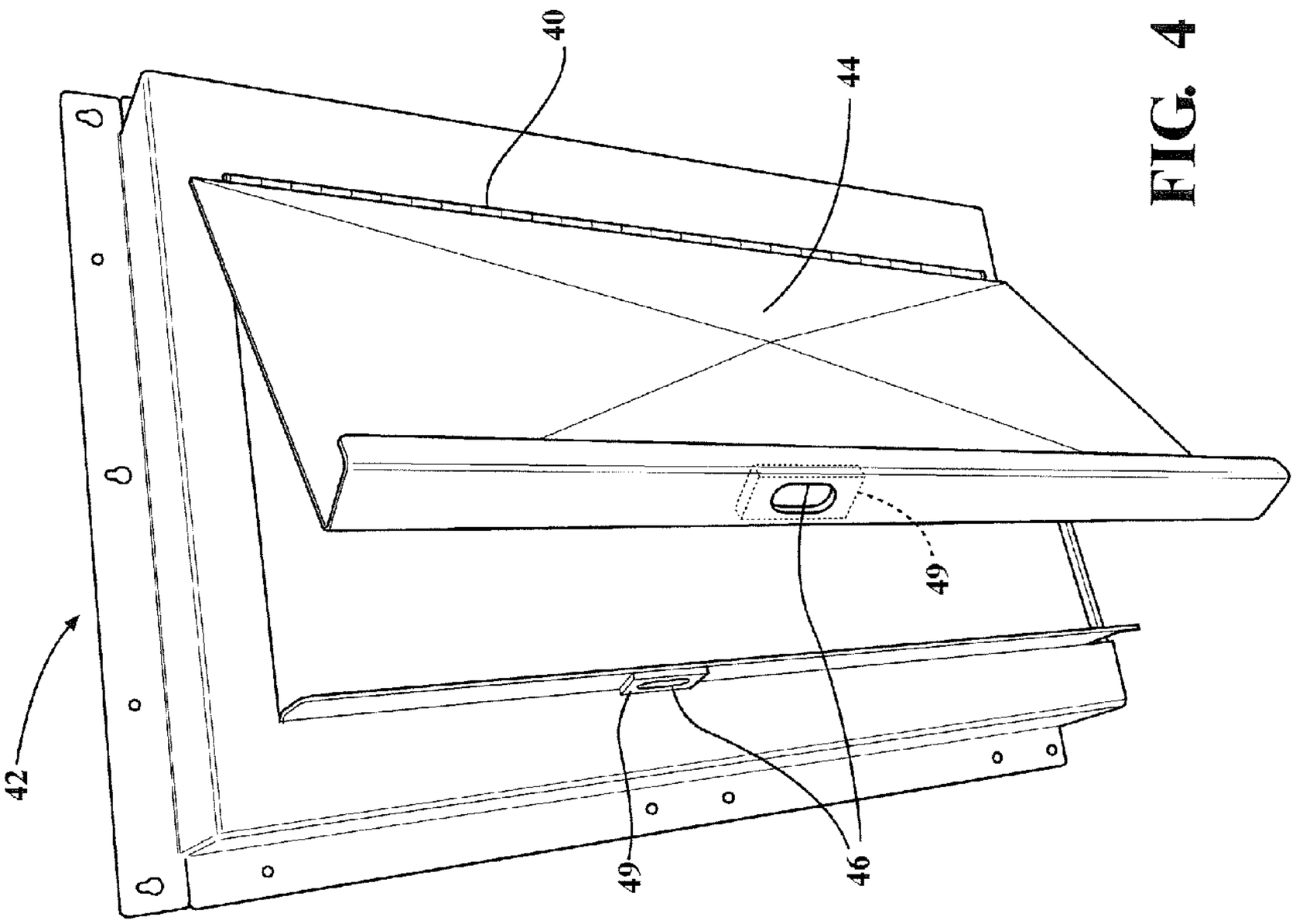

40
44
42
49
49
46

FIG. 4

SECURITY PANELS FOR COVERING WINDOW AND DOOR OPENINGS IN BUILDING STRUCTURES

CROSS-REFERENCE TO RELATED APPLICATION

This application claims the benefit of U.S. Provisional Patent Application Ser. No. 61/772,439, filed Mar. 4, 2013. The contents of the '439 application are incorporated herein by reference.

BACKGROUND

When buildings are unoccupied for long periods of time, or abandoned, and there is a need to prevent unauthorized persons from gaining access to the building through window and door openings, it is a common practice to "board up" the openings using plywood panels attached to the building by nails, bolts, or screws so as to cover these openings.

However, the plywood tends to deteriorate over time as a result of weathering and the like, and the plywood panels may be relatively easily broken open by determined vandals and the like to allow entry into the building.

SUMMARY

Various apparatuses for covering windows and door openings in building structures and methods for installing the apparatuses are disclosed.

In one implementation, a security panel apparatus for covering an opening in a building structure is disclosed. The security panel apparatus comprises a main panel section including stiffening bends extending diagonally between opposite corners of the main panel section; a plurality of side flanges extending away from the main panel section toward the opening in the building structure when the security panel is in an installation position; a plurality of edge sections each extending away from one of the side flanges in a direction generally parallel to the main panel section; and a plurality of apertures formed in at least one of the edge sections.

In another implementation, a method of installing a security panel apparatus is disclosed. The method includes installing a plurality of locating fasteners proximate to one or more edges of an opening in a building structure and aligning a security panel over the opening in the building structure. The security panel includes a main panel section including stiffening bends extending diagonally between opposite corners of the main panel section; a plurality of side flanges extending away from the main panel section toward the opening in the building structure when the security panel is aligned with the opening in the building structure; and a plurality of edge sections each extending away from one of the side flanges in a direction generally parallel to the main panel section. The method further includes hanging the security panel from the plurality of locating fasteners and securing the security panel to the building structure over the opening.

In another implementation, a security panel apparatus for covering an opening in a building structure and allowing access to the building structure is disclosed. The security panel includes a main panel section defining an access opening; a hinged front panel secured by a hinge to the main panel section covering the access opening and configured to allow authorized access to the opening in the building structure; a plurality of side flanges extending away from the main panel section toward the opening in the building structure when the security panel is in an installation position; and a plurality of edge sections each extending away from one of the side flanges in a direction generally parallel to the main panel section.

BRIEF DESCRIPTION OF THE DRAWINGS

The description makes reference to the accompanying drawings wherein like reference numerals refer to like parts throughout the several views, and wherein:

FIG. **1**A illustrates an example window security panel in front view

FIG. **1**B illustrates the window security panel of FIG. **1**A in end view;

FIG. **2**A illustrates another example window security panel in front view;

FIG. **2**B illustrates the window security panel of FIG. **2**A in end view;

FIG. **3**A illustrates an example door security panel in front view;

FIG. **3**B illustrates the door security panel of FIG. **3**A in end view;

FIG. **4** illustrates another example door security panel in perspective view; and

FIG. **5** illustrates an example process for installing a security panel over a window or door opening in a building structure.

DETAILED DESCRIPTION

The present disclosure is accordingly directed toward security panel structures sized to fit over window and door openings, with configurations that allow secure attachment of the security panels to the building. These security panels, for example, when constructed of sheet metal, can provide a substantially higher degree of security than wood panels and resist deterioration due to weather and aging.

The security panels can include main panel sections of generally rectangular shape having a size sufficient to cover common window or door openings. The main panel section can be stiffened by diagonally extending, intersecting stiffening bends extending out of the front of the main panel section. Side flanges can extend normally to the main panel section along at least some of the edges of the security panel. In one example, the side flanges can include side edge sections having 90 degree bends extending away from the main panel section of the security pane.

The security panels may also incorporate different types of apertures or holes along the edges of the main panel section and along the side flanges or side edge sections. Some types of holes can receive fasteners. For example, threaded fasteners such as self-threading screws, bolts, or nails may be passed through the holes in the side flanges, side edge sections, or main panel section to secure the security panels about the building openings. Other types of holes can allow ventilation, transmit light, or provide locating features for installation of the security panels.

In one embodiment, a main panel section of a door-covering-style security panel may be joined to a side flange by a piano hinge on one side, with lock openings or hasps secured by locks on the opposite side, in order to allow access to the building by authorized persons. In some embodiments, these hinged-style security panels are used on one of the doors of a building structure to allow secured entry through the security panel.

FIGS. **1**A and **1**B illustrate an example window security panel **10** in front view and end view. The illustrated window security panel **10**, like the other security panels described

herein, may be produced in a number of sizes to fit common building openings or may be customized to fit uniquely sized building openings. In the case of FIGS. **1**A and **1**B, the window security panel **10** has a height of approximately 60 inches and a width of approximately 47 inches to cover a slightly smaller window opening. The window security panel **10** may be formed of sheet metal, such as 16-gauge galvanized and annealed steel. The window security panel **10** can also include stiffening bends **12** that extend diagonally between the corners of the window security panel **10** and constitute sections bent slightly out of the plane of the window security panel **10** toward its forward side, away from the building when the window security panel **10** is installed. These stiffening bends **12** are sometimes termed "press brake lines," referring to the machine in which they are formed.

Side edges of the main panel section of the window security panel **10** of FIGS. **1**A and **1**B can be formed with an array of small holes **14**. In the example embodiment, there are three lines of holes **14** on each side of the main panel section. In this example, the holes **14** constitute quarter-inch diameter holes on one inch centers, although other sizes and spacing can be used in other embodiments. These holes **14** can have several purposes: first, the holes **14** can receive various fasteners in order to attach the window security panel **10** to a building; second, the holes **14** can allow for ventilation from the building; third, the holes **14** can allow for light transmission into the building.

As illustrated in the end view in FIG. **1**B, the window security panel **10** includes three side flanges **16** (only two of which are illustrated in the end view of FIG. **1**B) bent at 90 degrees away from the main panel section toward the building when the window security panel **10** is in an installation position. These side flanges **16** may also be formed on a press brake. In one embodiment, the side flanges **16** can have a width of 1.87 inches. The side flanges **16** can also terminate in side edge sections **18**, the side edge sections **18** being bent generally parallel to and projecting away from the main panel section. In the example shown in FIG. **1**A, the side edge sections **18** are formed with spaced holes **20**.

The holes **20** in the side edge sections **18** can also have several purposes: first, the holes **20** can receive various fasteners in order to attach the window security panel **10** to a building; second, the holes **20** can be used for locating purposes, being oversized in at least one dimension such that a worker installing the window security panel **10** can use one or more of the holes **20** to position the window security panel **10** before installation. In one example, the holes **20** can have a tear-drop shape well suited for locating purposes in that the larger portion of the hole **20** fits easily over one of the locating fasteners when aligning the window security panel **10** to the building structure and the smaller portion of the hole **20** allows the window security panel **10** to be hung in the installation position. Several tear-drop shaped holes are shown in FIG. **1**A along the top-most side edge section **18** of the window security panel **10**. In another example, the holes **20** are located on 6 inch centers suitable for attachment purposes.

The window security panel **10** of FIGS. **1**A and **1**B may be secured to a window frame (not shown), so that the window security panel **10** covers the window opening, by using appropriate fasteners extending through either or both of the holes **14** or **20**. Example fasteners include nails, screws, or bolts which may be joined to sockets laid into the window security panel **10**.

FIGS. **2**A and **2**B illustrate another example window security panel **22** in front view and end view. In this example, the window security panel **22** can cover a picture window, which is about twice the width of the smaller size window covered by the window security panel **10** of FIGS. **1**A and **1**B and is approximately the same height. This example window security panel **22** lacks the array of holes **14** present on the main panel section of the window security panel **10** of FIG. **1**A, but includes the array of holes **20** present in corresponding side edge sections **18**. Additionally, the window security panel **22** of FIGS. **2**A and **2**B can be formed from two panel sections **26**, **28** which are overlapped and connected together.

The connection between the panel sections **26**, **28** can be made as follows: the panel section **26** can include a side flange **16** abutting another side flange **16** on the panel section **28**. One of these abutting side flanges **16** can include spaced slot openings (not shown). The other of these abutting side flanges **16**, in this example, that of panel section **28**, can include spaced tongues, or tabs **24**, that fit into the spaced slot openings. The use of tabs **24** and slot openings allows for easier installation of the panel sections **26**, **28** of the window security panel **22** since it provides both locating and locking features between the panel sections **26**, **28**.

FIGS. **3**A and **3**B illustrate an example door security panel **31** in front view and end view. The door security panel **31** is intended for use with any of the doors that allow entry to and exit from the building. The door security panel **31** can be rectangular in dimension and adapted to cover a typical door frame opening. On opposed side edges of the main panel section, door security panel **31** includes lines of holes **30**, **32**. The lines of holes **30**, **32** can be used, for example, to fasten the door security panel **31** to a door frame opening or to allow light, airflow, or ventilation to enter and exit the building. In one example, the holes **30**, **32** are equally spaced and quarter-inch sized. Other than the difference in the holes **30**, **32**, the door security panel **31** is very similar to the previously described window security panels **10**, **22**. For example, the door security panel **31** can include stiffening bends **12** that extend diagonally between the corners and three side flanges **16** bent at 90 degrees away from a main panel section that terminate in side edge sections **18** bent generally parallel to and projecting away from the main panel section.

FIG. **4** illustrates another example door security panel **42** in perspective view. The door security panel **42** is similar to the door security panel **31** of FIGS. **3**A and **3**B, but it additionally includes a hinged front panel **44**. The hinged front panel **44** is secured by a hinge **40** to the main panel section of the door security panel **42** such that authorized access may be gained through the door behind the door security panel **42**. The side of the hinged front panel **44** located opposite to the hinge **40** can also include a lock opening **46**, for example, located on a bent flange section. The lock opening **46** allows the hinged front panel **44** to be locked or closed to the main panel section of the door security panel **42** using one or more combination locks or the like while still allowing access by authorized personnel to the building using the door opening behind the door security panel **42**. The main panel section of the door security panel **42** can also include a lock opening **46** corresponding in location to the lock opening **46** in the hinged front panel **44**, for example, located on a bent flange section.

Either or both of the bent flanged sections of the hinged front panel **44** and the main panel section can include a doubler plate **49** proximate to the location of the lock openings **46**. The doubler plate **49** can increase the thickness of either or both of the bent flanged sections proximate to the lock openings **46** in a range from one-quarter to three-eighths of an inch. The added thickness from the doubler plates **49** near the lock openings **46** can prevent the door frame beneath the door security panel **42** or the door itself from being manipulated such that unauthorized access could be gained to

the building. One or more doubler plates **49** can also serve to protect from a lock being removed from the lock openings **46**.

FIG. **5** illustrates an example process **50** for installing a security panel, for example, the window security panel **10** of FIGS. **1**A and **1**B or the door security panel **31** of FIGS. **3**A and **3**B, over a window or door opening in a building structure. The security panel can be constructed such that it will cover the entire opening in order to keep air, dirt, weather, and unauthorized persons out of the building structure. Alternatively, the security panel can be constructed to cover most of the opening in the building structure, leaving only a top portion of the opening uncovered. The opening can prepped for security panel installation by a worker identifying and removing any obstructions near the opening that would impede installation of the security panel. The security panel, or several security panels, can be selected for use with the opening after a worker measures the opening.

Once the properly-sized security panel(s) has been selected, a worker can install a plurality of locating fasteners proximate to one or more edges of the opening in a building structure in step **52** of the process **50**. For example, the locating fasteners can be secured into holes drilled directly into the building structure outboard of several corners of the opening. Installing the locating fasteners directly to the building structure can make the installation of the security panel as structurally sound as possible to avoid removal of the security panel. The position of the locating fasteners is also dependent on the number of security panels being used to cover the opening. If, for example, two security panels are being used to cover the opening, additional support means, such as a vertical wooden support, can be added in the center of the opening and locating fasteners can be attached to the additional support means.

In step **54** of the process **50**, a worker can align the security panel to be installed over the opening in the building structure. The security panel can be similar to the window security panel **10** shown in FIG. **1**A, including a main panel section with stiffening bends **12** extending diagonally between opposite corners of the main panel section, a plurality of side flanges **16** extending away from the main panel section toward the opening in the building structure when the security panel is aligned with the opening in the building structure, and a plurality of side edge sections **18** each extending away from one of the side flanges **16** in a direction generally parallel to the main panel section.

The security panel can also include apertures formed in at least one of the side edge sections, such as the holes **20** formed in the side edge sections **18** of the window security panel **10** shown in FIG. **1**A. At least some of these apertures can be configured to allow the security panel to be hung from the plurality of locating fasteners in an installation position. For example, the apertures can have a tear-drop shape, such as is shown in several locations along the topmost side edge section **18** in FIG. **1**A, suitable to allow a worker to easily position the security panel over the locating fasteners and hang the security panel from the locating fasteners. Some of the apertures can be configured to allow the security panel to be secured to the building structure over the opening. Additionally, the security panel can include apertures formed in the main panel section, such as the holes **14** formed in the main panel section of the window security panel **10** shown in FIG. **1**A. At least some of the apertures in the main panel section can be configured to allow the security panel to be secured to the building structure over the opening and others can be configured to allow light, airflow, or ventilation, to pass through the security panel from the opening in the building structure.

In step **56** of the process **50**, a worker can hang the security panel from one or more of the of locating fasteners, for example, by sliding some of the apertures in either the main panel section or one or more of the edge sections over the locating fasteners and allowing the locating fasteners to support the security panel against the building structure. In one example, at least one locating fastener is installed centrally above the top of the opening in the building structure in order to center the security panel before hanging it in the installation position.

In step **58** of the process **50**, a worker can secure the security panel to the building structure over the opening, for example, using securing fasteners installed through apertures in the main panel section, edge sections, or side flanges. In one example, a pair of workers can secure the security panel to the building structure after it has been located in the installation position. In this example, a first worker partially secures the fasteners through the relevant apertures and a second worker fully tightens the fasteners to finish the installation. In one embodiment, the bottom edge of the security panel will rest on a lower window sash or a door threshold once secured into position over the opening. After step **58**, the process **50** ends.

The foregoing description relates to what are presently considered to be the most practical embodiments. It is to be understood, however, that the disclosure is not to be limited to these embodiments but, on the contrary, is intended to cover various modifications and equivalent arrangements included within the spirit and scope of the appended claims, which scope is to be accorded the broadest interpretation so as to encompass all such modifications and equivalent structures as is permitted under the law.

What is claimed is:

1. A security panel for covering an opening in a building structure, comprising:

a main panel section including a pair of intersecting stiffening bends extending diagonally between opposite corners of the main panel section and away from the building structure when the security panel is in an installation position to form a peak at the intersection of the stiffening bends;

a plurality of side flanges extending normally from the main panel section toward the opening in the building structure when the security panel is in the installation position;

a plurality of edge sections each extending away from one of the side flanges in a direction generally parallel to the main panel section wherein the plurality of edge sections are spaced from the main panel section by the plurality side flanges such that both the plurality of side flanges and the plurality of edge sections abut a portion of the building structure in the installation position; and

a plurality of apertures formed in at least one of the edge sections and at least one of the side flanges.

2. The security panel of claim **1**, wherein at least some of the plurality of apertures in the at least one edge section and the at least one side flange are configured to allow the security panel to be secured to the building structure over the opening.

3. The security panel of claim **1**, wherein at least some of the plurality of apertures are configured to allow the security panel to be hung in the installation position from a plurality of locating fasteners installed proximate to one or more edges of the opening in the building structure.

4. The security panel of claim **1**, further comprising:

a plurality of apertures formed in the main panel section.

5. The security panel of claim **4**, wherein at least some of the plurality of apertures formed in the main panel section are

configured to allow the security panel to be secured to the building structure over the opening.

6. The security panel of claim **4**, wherein at least some of the plurality of apertures formed in the main panel section are configured to allow light and airflow to pass through the security panel from the opening in the building structure.

7. The security panel of claim **1**, wherein the security panel is a first security panel and wherein at least some of the plurality of apertures formed in the at least one of the side flanges are configured to allow a second security panel to be secured to the first security panel.

8. The security panel of claim **7**, wherein the second security panel includes a plurality of tabs configured to allow the second security panel to be secured within the plurality of apertures formed in the at least one side flange of the first security panel.

9. A method, comprising:

aligning a security panel over an opening in a building structure, wherein the security panel comprises:

a main panel section including a pair of intersecting stiffening bends extending diagonally between opposite corners of the main panel section and away from the building structure when the security panel is aligned over the opening in the building structure to form a peak at the intersection of the stiffening bends;

a plurality of side flanges extending normally from the main panel section toward the opening in the building structure when the security panel is aligned over the opening in the building structure;

a plurality of edge sections each extending away from one of the side flanges in a direction generally parallel to the main panel section wherein the plurality of edge sections are spaced from the main panel section by the plurality side flanges such that both the plurality of side flanges and the plurality of edge sections abut a portion of the building structure in the installation position; and

a plurality of apertures formed in at least one of the edge sections and at least one of the side flanges;

hanging the security panel from a plurality of locating fasteners, the plurality of locating fasteners proximate to one or more edges of the opening in the building structure; and

securing the security panel to the building structure over the opening.

10. The method of claim **9**, wherein at least some of the plurality of apertures are configured to allow the security panel to be hung from the plurality of locating fasteners in an installation position.

11. The method of claim **9**, wherein at least some of the plurality of apertures are configured to allow the security panel to be secured to the building structure over the opening.

12. The method of claim **9**, wherein the security panel further comprises:

a plurality of apertures formed in the main panel section.

13. The method of claim **12**, wherein at least some of the plurality of apertures are configured to allow the security panel to be secured to the building structure over the opening.

14. The method of claim **12**, wherein at least some of the plurality of apertures are configured to allow light and airflow to pass through the security panel from the opening in the building structure.

15. The method of claim **9**, wherein the security panel is a first security panel and wherein at least some of the plurality of apertures formed in the at least one of the side flanges are configured to allow a second security panel to be secured to the first security panel.

16. The method of claim **15**, wherein the second security panel includes a plurality of tabs configured to allow the second security panel to be secured within the plurality of apertures formed in the at least one side flange of the first security panel.

17. A security panel for covering an opening in a building structure and allowing authorized access to the building structure, comprising:

a main panel section defining an access opening;

a hinged front panel secured by a hinge to the main panel section for covering the access opening wherein the hinged front panel is configured to allow authorized access to the opening in the building structure and includes a pair of intersecting stiffening bends extending diagonally between opposite corners of the hinged front panel and away from the building structure when the security panel is in an installation position to form a peak at an intersection of the stiffening bends;

a plurality of side flanges extending normally from the main panel section toward the opening in the building structure when the security panel is in the installation position;

a plurality of edge sections each extending away from one of the side flanges in a direction generally parallel to the main panel section wherein the plurality of edge sections are spaced from the main panel section by the plurality side flanges such that both the plurality of side flanges and the plurality of edge sections abut a portion of the building in the installation position; and a plurality of apertures formed in at least one of the plurality of edge sections and at least one of the plurality of side flanges and wherein at least some of the plurality of apertures are configured to allow the security panel to be secured to the building structure over the opening.

18. The security panel of claim **17**, wherein the security panel includes a plurality of apertures formed in at least one of the plurality of edge sections and at least one of the plurality of side flanges and wherein at least some of the plurality of apertures are configured to allow the security panel to be secured to the building structure over the opening.

19. The security panel of claim **18**, wherein at least some of the plurality of apertures are configured to allow the security panel to be hung in the installation position from a plurality of locating fasteners installed proximate to one or more edges of the opening in the building structure.

* * * * *